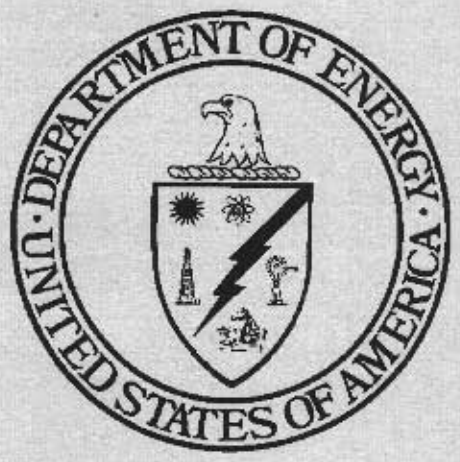
Sandia National Laboratories/New Mexico

PROPOSAL FOR NO FURTHER ACTION ENVIRONMENTAL RESTORATION PROJECT SITE 138, BUILDING 6630 SEPTIC SYSTEM OPERABLE UNIT 1295

June 1996

Environmental Restoration Project



United States Department of Energy
Albuquerque Operations Office

PROPOSAL FOR
NO FURTHER ACTION
ENVIRONMENTAL RESTORATION PROJECT

SITE 138, BUILDING 6630 SEPTIC SYSTEM
OPERABLE UNIT 1295
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Prepared by Sandia National Laboratories/New Mexico
Environmental Restoration Project
Albuquerque, New Mexico

Prepared for the
United States Department of Energy

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1. INTRODUCTION

1.1 ER Site 138, Building 6630 Septic System

Sandia National Laboratories/New Mexico (SNL/NM) is proposing a no further action (NFA) decision based on confirmatory sampling for Environmental Restoration (ER) Site 138, Building 6630 Septic System, Operable Unit (OU) 1295. ER Site 138 is listed in the Hazardous and Solid Waste Amendments (HSWA) Module IV (EPA August 1993) of the SNL/NM Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Facility Permit (NM5890110518-1) (EPA August 1992).

1.2 SNL/NM Administrative NFA Process

This proposal for a determination of a NFA decision based on confirmatory sampling was prepared using the criteria presented in Section 4.5.3 of the SNL/NM Program Implementation Plan (PIP) (SNL/NM February 1995). Specifically, this proposal "must contain information demonstrating that there are no releases of hazardous waste (including hazardous constituents) from solid waste management units (SWMUs) at the facility that may pose a threat to human health or the environment" (as proposed in 40 CFR 264.514[a] [2]) (EPA July 1990). The HSWA Module IV contains the same requirements for an NFA demonstration:

> "Based on the results of the RFI [RCRA Facility Investigation] and other relevant information, the Permittee may submit an application to the Administrative Authority for a Class III permit modification under 40 CFR 270.42(c) to terminate the RFI/CMS [corrective measures study] process for a specific unit. This permit modification application must contain information demonstrating that there are no releases of hazardous waste including hazardous constituents from a particular SWMU at the facility that pose threats to human health and/or the environment, as well as additional information required in 40 CFR 270.42(c) (EPA August 1993)."

If the available archival evidence is not considered convincing, SNL/NM performs confirmatory sampling to increase the weight of the evidence and allow an informed decision on whether to proceed with the administrative-type NFA or to return to the site characterization program for additional data collection (SNL/NM February 1995).

The Environmental Protection Agency (EPA) acknowledged that the extent of sampling required may vary greatly, stating that:

> the agency does not intend this rule [the second codification of HSWA] to require extensive sampling and monitoring at every SWMU. . . . Sampling is generally required only in situations where there is insufficient evidence on which to make an initial release determination. . . . The actual extent of sampling will vary . . . depending on the amount and quality of existing information available (EPA December 1987).

This request for an NFA decision for ER Site 138 is based primarily on results of a passive soil-gas survey (NERI June 1995) and analytical results of confirmatory soil samples collected at the site. Concentrations of site-specific constituents of concern (COCs) detected in the soil samples were first compared to background 95th percentile or upper tolerance limit (UTL) concentrations of COCs found in SNL/NM soils (IT March 1996) or other relevant background limits. If no SNL/NM background limit was available for a particular COC, or if the COC concentration exceeded the SNL/NM or other relevant background limit, then the constituent concentration was compared to the proposed 40 CFR Part 264 Subpart S (Subpart S) or other relevant soil action level for the compound (EPA July 1990). If the COC concentration exceeded both the background limit and relevant action level for that compound, or if no background limit or action level has been determined or proposed for the constituent, then a risk assessment was performed. The highest concentration of the particular COC identified at the site was then compared to the derived risk assessment action level to determine if the COC concentration at the site poses a significant health risk.

A site is eligible for an NFA proposal if it meets one or more of the following criteria presented in the Environmental Restoration Document of Understanding (NMED, November 1995):

- NFA Criterion 1: The site cannot be located or has been found not to exist, is a duplicate potential release site (PRS) or is located within and therefore, investigated as part of another PRS.

- NFA Criterion 2: The site has never been used for the management (that is, generation, treatment, storage, or disposal) of RCRA solid or hazardous wastes and/or constituents or other CERCLA hazardous substances.

- NFA Criterion 3: No release to the environment has occurred, nor is likely to occur in the future.

- NFA Criterion 4: There was a release, but the site was characterized and/or remediated under another authority which adequately addresses corrective action, and documentation, such as a closure letter, is available.

- NFA Criterion 5: The PRS has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use.

Review and analysis of the ER Site 138 soil sample analytical data indicate that concentrations of COCs detected in soils at this site are less than (1) SNL/NM or other applicable background concentrations, or (2) proposed Subpart S or other action levels, or (3) derived risk assessment action levels. Thus ER Site 138 is being proposed for an NFA decision based on confirmatory sampling data demonstrating that hazardous waste or COCs that may have been released from this SWMU into the environment pose an acceptable level of risk under current and projected future land use (Criterion 5).

1.3 Local Setting

SNL/NM occupies 2,829 acres of land owned by the Department of Energy (DOE), with an additional 14,920 acres of land provided by land-use permits with Kirtland Air Force Base (KAFB), the United States Forest Service (USFS), the State of New Mexico, and the Isleta Indian Reservation. SNL/NM has been involved in nuclear weapons research, component development, assembly, testing, and other research and development activities since 1945 (DOE September 1987).

ER Site 138 is located on KAFB, and is in the southeast quadrant of SNL/NM Technical Area III (TA III). Access to the site is provided by paved and graded dirt roads that extend approximately 1.7 miles south from the controlled-access TA III main gate (Figure 1-1). ER Site 138 consists of the immediate area around a 600-gallon septic tank west of Building 6630, and the area west of the septic tank around a drainfield which consists of four 4-inch clay-tile distribution lines (SNL/NM September 1994) (Figure 1-2). The site encompasses approximately 0.27 acres of flat-lying land at an average mean elevation of 5,409 feet above mean sea level (AMSL).

The surficial geology at ER Site 138 is characterized by alluvial fan deposits. These heterogeneous deposits contain poorly sorted, laterally and vertically discontinuous sand, silt, and gravel beds (SNL/NM March 1996). Based on drilling records of similar deposits at KAFB, the alluvial materials are highly heterogeneous, composed primarily of medium to fine silty sands with frequent coarse sand, gravel, and cobble lenses. The alluvial deposits probably extend to the water-table. Vegetation consists predominantly of grasses including grama, muhly, dropseed, and galleta. Shrubs commonly associated with the grasslands include sand sage, winter fat, saltbrush, and rabbitbush. Cacti are common, and include cholla, pincushion, strawberry, and prickly pear (SNL/NM March 1993).

The water-table elevation is approximately 4,930 feet AMSL at this location, so depth to ground-water is approximately 479 feet. Local groundwater flow is believed to be in a generally west to northwest direction in the vicinity of this site (SNL/NM March 1996). The nearest production wells are northwest of the site and include KAFB-1, 2, 4, 7, and 14, which are approximately 4 to 6 miles away. The nearest ground-water monitoring wells to the site are the group of wells installed around the Chemical Waste Landfill in the southeast corner of TA III and MWL-BW1 in the Mixed Waste Landfill in the center of TA III. These wells are located, respectively, approximately 0.7 miles southeast and northwest of ER Site 138 (SNL/NM October 1995).

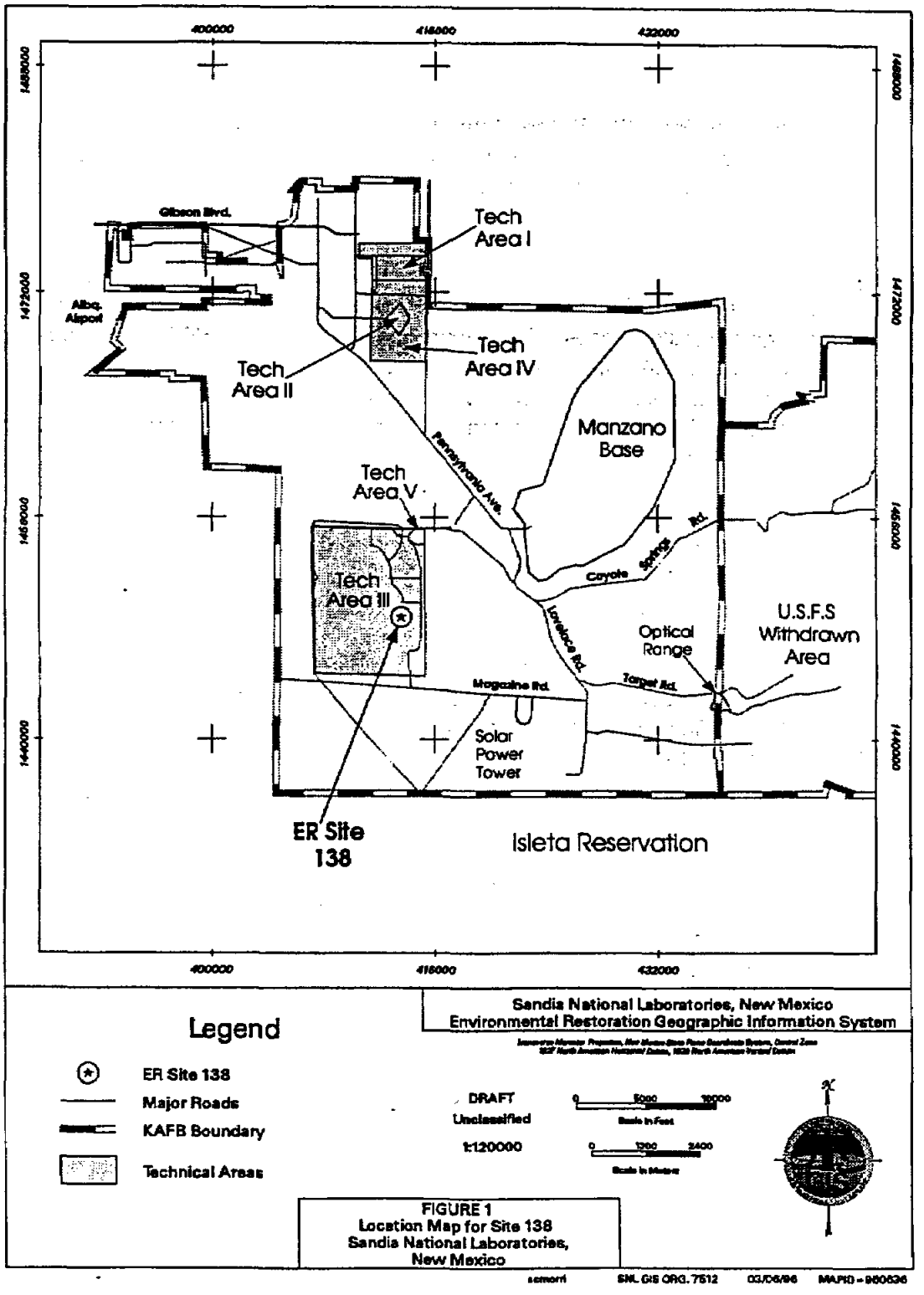

Figure 1-1: ER Site 138 Location Map

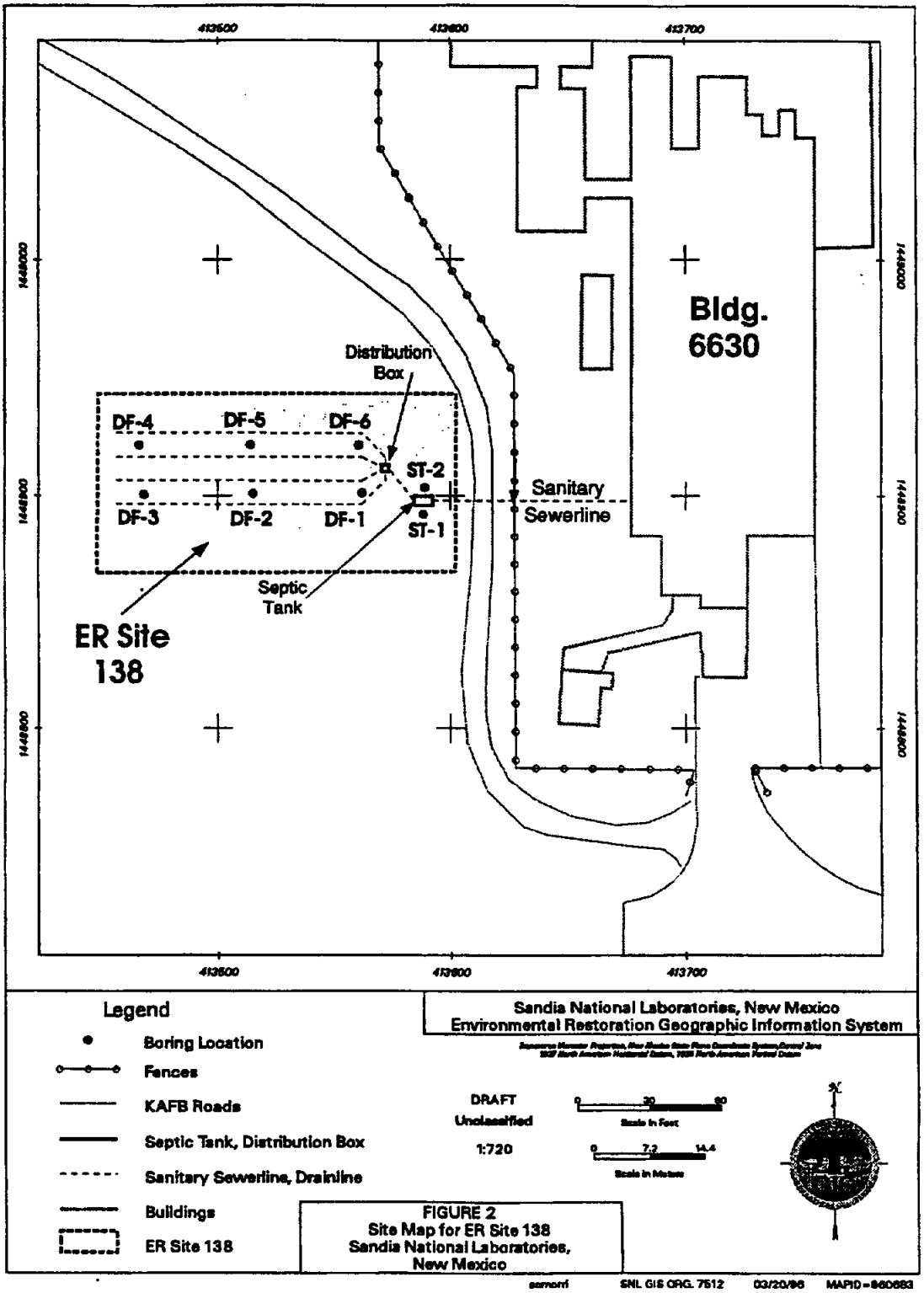

Figure 1-2: ER Site 138 Site Map

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2. HISTORY OF THE SWMU

2.1 Sources of Supporting Information

In preparing the confirmatory sampling NFA proposal for ER Site 138, available background information was reviewed to quantify potential releases and to select analytes for the soil sampling. Background information was collected from SNL/NM Facilities Engineering drawings and interviews with employees familiar with the site operational history. The following sources of information, hierarchically listed with respect to assigned validity, were used to evaluate ER Site 138:

- Confirmatory subsurface soil sampling conducted in December 1994 (SNL/NM December 1994a and b);
- Two survey reports, including a geophysical survey (Lamb 1994), and a passive soil gas survey (NERI June 1995);
- Results of samples collected from the septic tank and distribution box in 1994, 1995 and 1996 (SNL/NM May 1994 and January 1995);
- RCRA Facility Investigation Work Plan for OU 1295, Septic Tanks and Drainfields (SNL/NM March 1993);
- Photographs and field notes collected at the site by SNL/NM ER staff;
- SNL/NM Facilities Engineering building drawings (SNL/NM June 1959);
- SNL/NM Geographic Information System (GIS) data; and
- The RCRA Facility Assessment (RFA) report (EPA April 1987).

2.2 Previous Audits, Inspections, and Findings

ER Site 138 was first listed as a potential release site in the RFA report to the EPA in 1987 (EPA April 1987). This report contained a generic statement about this and many other SNL/NM septic systems where sanitary and industrial wastes may have been discharged during past operations. This SWMU was included in the RFA report as Site number 79, along with other septic and drain systems at SNL/NM. All the sites included in Site 79 are now designated by individual SWMU numbers.

2.3 Historical Operations

The following historical information has been excerpted from several sources, including SNL/NM March 1993, IT March 1994, and SNL/NM November 1994a.

Building 6630, the Melting/Solidification Facility, was constructed in 1959 for environmental testing of steel alloys. Metal mixtures containing iron, nickel, chromium, manganese, silicon, copper, depleted uranium, molybdenum, and titanium were melted in either a vacuum induction furnace, a vacuum arc furnace, or a high-vacuum electron beam furnace. Ingots from the furnaces were milled by various saws, which were cooled by an ethylene glycol/water recirculating system. A limited number of corrosion studies were performed on the alloys in a salt spray/fog climatic chamber. The septic system received wastewater from the bathrooms, sinks, floor drains, and sumps in Bldg. 6630. Estimated effluent discharge rates ranged between 120 and 1,200 gallons per day. Past spills of ethylene glycol coolant occurred and may have been flushed down the floor drains or into the sumps. Discharges from the sumps no longer occur. At one time a vacuum pump in the facility spilled approximately 76 gallons of chlorinated lubricating oil, which may have contained polychlorinated biphenyls, into one of the sumps. The spill was managed by using absorbent materials and wiping affected areas. The contaminated material was drummed and transported off-site for disposal. Interviews with building users indicate that approximately 20 gallons of solvents were used for cleaning parts and vacuum chambers. The solvents included acetone, alcohol, carbon tetrachloride, trichloroethene, and xylene. Small quantities of hydrochloric and nitric acid were used in etching operations.

3. EVALUATION OF RELEVANT EVIDENCE

3.1 Unit Characteristics

There are no safeguards inherent in the drain systems from Buildings 6630 or in facility operations that could have prevented past releases to the environment.

3.2 Operating Practices

As discussed in Section 2.3, effluent was released to the Building 6630 septic tank and drainfield when the septic system was active. Hazardous wastes were not managed or contained at ER Site 138.

3.3 Presence or Absence of Visual Evidence

No visible evidence of soil discoloration, staining, or odors indicating residual contamination was observed when soil samples were collected in the drainfield and around the septic tank in December 1994 (SNL/NM December 1994a).

3.4 Results of Previous Sampling/Surveys

Septic tank sludge samples were collected in May 1994 and January 1995 (SNL/NM May 1994 and January 1995) for waste characterization purposes and were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total and Toxicity Characteristic Leaching Procedure (TCLP) RCRA metals, isotopic uranium, polychlorinated biphenyls (PCBs), tritium, and gamma spectroscopy radionuclides. The septic system was not used after 1990 and the sludge in the tank was very dry. Concentrations of a number of RCRA metals were detected. However, only barium and cadmium were detected in the TCLP analysis and concentrations of both were below regulatory levels. The SVOC analysis identified a phthalate above the detection limit and trace quantities of 11 other SVOCs. The PCB analysis detected Aroclor 1254 in the sludge. The VOC analysis detected methylene chloride, acetone, and 2-butanone in the sludge. However, these are common laboratory contaminants. Analysis of the septic tank sludge detected a uranium-238 anomaly.

The distribution box had a small amount of sludge that was sampled in January 1996 for RCRA metals, tritium, isotopic uranium, and gamma spectroscopy radionuclides. The concentrations of metals were all lower than those in the septic tank sludge because of the precipitation mechanism in the tank. No radiological anomalies were evident and there was no detectable tritium. The analytical results of the septic tank and distribution box samples are presented in Appendix A.1.

A geophysical survey using a Geonics™ model EM-38 ground conductivity meter was performed at the site in June 1994 to attempt to locate the drainfield. The technique was not successful in delineating the drainfield or finding areas of higher moisture concentrations (Lamb 1994).

The passive soil-gas survey conducted in the area of the drainfield in June and November 1994 used PETREX™ sampling tubes to identify any releases of VOCs and SVOCs from the drainfield that may have occurred (SNL/NM, November, 1994b). A PETREX™ soil-gas survey

is a semi-quantitative screening procedure that can be used to identify many volatile and semivolatile organic compounds. This technique may be used to guide VOC and SVOC site investigations. The advantages of this sampling methodology are that large areas can be surveyed at relatively low cost, the technique is highly sensitive to organic vapors, and the result produces a measure of soil vapor chemistry over a two- to three-week period rather than at one point in time. Each PETREX™ soil-gas sampler consists of two activated charcoal coated wires housed in a reusable glass test tube container. At each sampling location, sample tubes are buried in an inverted position so that the mouth of the sampler is about 1 foot below grade. Samplers are left in place for a two- to three-week period, and are then removed from the ground and sent to the manufacturer, Northeast Research Institute (NERI), for analysis using thermal desorption-gas chromatography/mass spectrometry. The analytical laboratory reports all sample results in terms of "ion counts" instead of concentrations, and identifies those samples that contain compounds above the PETREX™ technique detection limits. In NERI's experience, levels below 100,000 ion counts for a single compound (such as perchloroethene [PCE] or trichloroethene[TCE]), and 200,000 ion counts for mixtures (such as BTEX or aliphatic compounds [C4-C11 cycloalkanes]), under normal site conditions, would not represent detectable levels by standard quantitative methods for soils and/or groundwater (NERI June 1995).

Fifty-five PETREX™ tube samplers were placed, in two phases, in a grid pattern that covered the drainfield and septic tank area at this site (SNL/NM November 1994b). A map showing the tube sampling locations and the analytical results of the ER Site 138 passive soil gas survey is presented in Appendix A.2. The soil gas survey detected tetrachloroethene, trichloroethene, BTEX, and aliphatic compounds at several locations in and around the drainfield. However, at one of the sample locations where trichloroethene was detected, an additional overlapping PETREX sample did not detect trichloroethene. Also, subsequent confirmatory soil samples that were collected near some of the PETREX sample locations in the drainfield and analyzed for VOCs and SVOCs did not detect any of these constituents.

3.5 Assessment of Gaps in Information

The most recent material in the septic tank was not necessarily representative of all discharges to the unit that occurred since it was put into service in 1959. The analytical results of the various rounds of septic tank sampling were used, along with process knowledge and other available information, to help identify the most likely COCs that might be found in soils surrounding the septic tank and beneath the drainfield, and to help select the types of analyses to be performed on soil samples collected from the site. While the history of past releases at the site is incomplete, analytical data from confirmatory soil samples collected in December 1994 (discussed below) are sufficient to determine whether releases of COCs occurred at the site.

3.6 Confirmatory Sampling

Although the likelihood of significant releases of hazardous constituents at ER Site 138 was considered low, confirmatory soil sampling was conducted to determine whether COCs above background or action levels were released via the septic system at this site. A backhoe was used in September 1994 to determine the location, dimensions, and depth of the ER Site 138 drainfield, which had no surface expression (SNL/NM September 1994). The drainfield excavation operation is shown in Figure 3. Once the drainfield was located, soil samples were collected from boreholes within the drainfield, and from either side of the septic tank (SNL/NM

December 1994a). The confirmatory soil sampling program was performed in accordance with the rationale and procedures described in the Septic Tank and Drainfields (ADS-1295) RCRA Facility Investigation Work Plan (SNL/NM March 1993), and addenda to the Work Plan developed during the OU 1295 project approval process (IT March 1994 and SNL/NM November 1994a). A summary of the types of samples, number of sample locations, sample depths and analytical requirements for confirmatory soil samples collected at this site is presented in Table 3-1.

Confirmatory soil samples were collected from one boring on either side of the septic tank, and from six borings located in the middle and near the ends of the two pairs of drainfield lateral lines (Figure 1-2). For septic tank borings, samples were collected from one interval in each borehole starting at the outside bottom of the tank, which was 10 feet below ground surface (BGS) at this site. For the drainfield borings, samples were collected from two intervals in each borehole. The top of the shallow interval started at the bottom of the drain line trenches which were 6.5 feet BGS on average at this site, and the lower (deep) interval started at 10 feet below the top of the upper interval, or 16.5 feet BGS.

The Geoprobe™ sampling system was used to collect subsurface soil samples at this site. The Geoprobe™ sampling tool was fitted with a butyl acetate (BA) sampling sleeve and was then hydraulically driven to the top of the designated sampling depth. The sampling tool was opened, and driven an additional two feet in order to fill the two-foot long by approximately 1.25-inch diameter BA sleeve. The sampling tool and soil-filled sleeve were then retrieved from the borehole. In order to minimize the potential for loss of volatile compounds (if present), the soil to be analyzed for VOCs was not emptied from the BA sleeve into another sample container. The filled BA sleeve was removed from the sampling tool, and the top seven inches were cut off. Both ends of the seven-inch section of filled sleeve were immediately capped with a teflon membrane and rubber end cap, sealed with tape, and placed in an ice-filled cooler at the site. The soil in this section of sleeve was submitted for a VOC analysis.

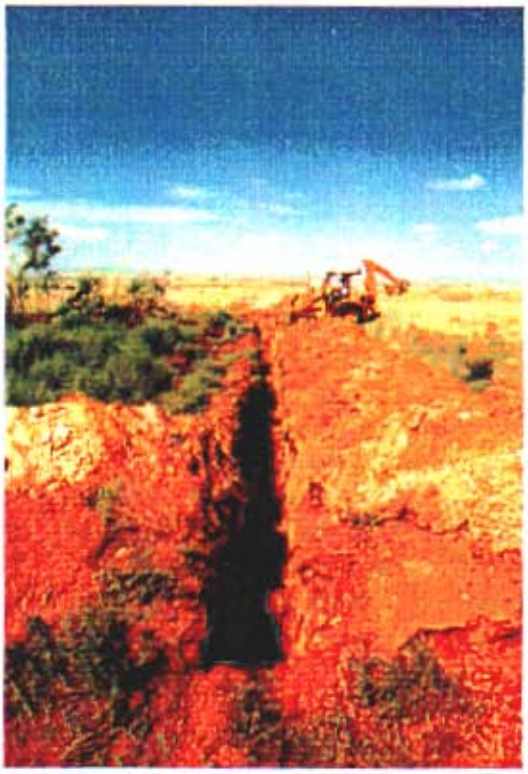
Soil from the remainder of the sleeve was then emptied into a decontaminated mixing bowl. Following this, additional two-foot sampling runs were completed in order to recover enough soil to satisfy sample volume requirements for the interval. Soil recovered from these additional runs was also emptied into the mixing bowl, and blended with soil from the first sampling run. The soil was then transferred from the bowl into sample containers using a decontaminated plastic spatula.

Table 3-1
ER Site 138: Confirmatory Sampling Summary Table

Sampling Location	Analytical Parameters	Number of Borehole Locations	Top of Sampling Intervals at Each Boring Location	Total Number of Investigative Samples	Total Number of Duplicate Samples	Date(s) Samples Collected
Drainfield	VOCs	6	6.5', 16.5'	12	1	12/19, 20/94
	SVOCs	6	6.5', 16.5'	12	1	
	Soil pH	6	6.5', 16.5'	12	1	
	PCBs	6	6.5', 16.5'	12	1	
	RCRA metals + Ni	6	6.5', 16.5'	12	1	
	Cyanide	6	6.5', 16.5'	12	1	
	Gamma spec. composite	6	6.5', 16.5'	2		
	Tritium composite	6	6.5', 16.5'	2		
	Isotopic uranium composite	6	6.5', 16.5'	2		
Septic tank	VOCs	2	10'	2		12/19/94
	SVOCs	2	10'	2		
	Soil pH	2	10'	2		
	PCBs	2	10'	2		
	RCRA metals + Ni	2	10'	2		
	Cyanide	2	10'	2		
	Isotopic uranium composite	2	10'	1		
	Gamma spec. composite	2	10'	1		
	Tritium composite	2	10'	1		

Notes
Ni = Nickel
PCB = polychlorinated biphenyls
RCRA = Resource Conservation and Recovery Act
Spec. = Spectroscopy
SVOCs = Semivolatile organic compounds
VOCs = Volatile organic compounds

Drainfield and septic tank soil samples were analyzed for VOCs, SVOCs, cyanide, PCBs, RCRA metals, and nickel by a commercial laboratory. Samples were shipped to the offsite commercial laboratories by an overnight delivery service. Samples were analyzed for pH at the SNL/NM field laboratory. Also, to determine if radionuclides were released from past activities at this site, composite samples were collected from the drainfield shallow and deep sampling intervals and were analyzed by a commercial laboratory for tritium and isotopic uranium, and were screened for other radionuclides using SNL/NM in-house gamma spectroscopy. Routine SNL/NM chain-of-custody and sample documentation procedures were employed for all samples collected at this site.



Excavating down to drainlines to determine configuration, 9/6/94. View looking west.

Septic tank sludge removal and cleaning, 10/10/95.

Figure 3-1: ER Site 138 Photographs

Quality assurance/quality control (QA/QC) samples collected during this effort consisted of one set of duplicate soil samples from the shallow sampling interval in DF-5 (Figure 2) analyzed for RCRA constituents. Concentrations of constituents detected in the duplicate soil samples were generally in good agreement with those detected in the equivalent field samples from the same intervals. One set of aqueous equipment rinsate samples were also collected following completion of soil sampling at the site and were analyzed for the same non-radiologic constituents and isotopic uranium as the soil samples collected at this site. Trace levels of the common laboratory contaminant methylene chloride were detected in the equipment blank, but no SVOCs, cyanide, or metals were identified. Low activity levels of the three isotopic uranium radionuclides were also identified in the rinsate samples. Also, a soil trip blank sample was included with the shipment of ER Site 138 VOC soil samples to the commercial laboratory and was analyzed for VOCs only. The following compounds were detected in the trip blank: acetone, methyl ethyl ketone (MEK), and methylene chloride. These common laboratory contaminants were either not detected, or were found in lower concentrations in the characterization samples. Soil used for the trip blank was prepared by heating the material, and then transferring it immediately to the sample container. This heating process drives off any residual organic compounds (if present), and soil moisture, that may be contained in the material. It is thought that when the soil trip blank container was opened at the laboratory, it immediately adsorbed both moisture and VOCs present in the laboratory atmosphere, and therefore became contaminated.

Summaries of all constituents detected by commercial laboratory analyses and pH measurements completed by the SNL/NM field laboratory in these confirmatory samples are presented in Tables 3-2, 3-3, and 3-4. Results of the SNL/NM in-house gamma spectroscopy composite soil sample screening for other radionuclides are presented in Appendices A.3 through A.5. Complete soil sample analytical data packages are archived in the SNL/NM Environmental Operations Records Center and are readily available for review and verification (SNL/NM December 1994b).

3.7 Rationale for Pursuing a Confirmatory Sampling NFA Decision

As discussed in Section 3.4, the passive soil-gas survey identified some areas with VOC anomalies in the drainfield area and septic tank area but subsequent soil sampling did not confirm the existence of detectable concentrations of these compounds in soils beneath and around these units.

Confirmatory soil sampling around the septic tank and in the drainfield did not identify any residual COCs indicating past discharges that could pose a threat to human health or the environment. As shown in Table 3-2, only below-reporting-limit concentrations of three VOC compounds (acetone, methylene chloride, and toluene), which are common laboratory contaminants, were detected in soil samples collected from this site. Cyanide and PCBs were not detected. Trace concentrations of the SVOCs bis (2-ethylhexyl) phlalate (BEHP), 2-chloro-napthalene, and phenol were detected in three soil samples in the shallow sampling interval. These constituents were not detected in the deeper intervals at the same locations. The pH of the soil indicates that it is slightly alkaline.

Table 3-2

ER Site 138
Summary of Organic and Other Constituents, and pH Measurements in Confirmatory Soil Samples Collected Around the Septic Tank and in the Drainfield

Sample Number	Sampl Matrix	Sampl Type	Sample Date	Sample Location (Figure 2	Top of Sample Interval (fbgs)	VOCs Method 8240 Acetone	MEK	Methylene Chloride	Toluene	SVOCs Method 8270 BEHP	2-Chloro-napthalene	Phenol	Cyanide Method 9010/9012	PCBs Method 8080	Units	Soil pH ASTM Method 4972 (pH units)
Septic Tank Soil Samples:																
018845-1,2	Soil	Field	12/19/94	ST-1	10	ND	ND	2.5 B,J	ND	ND	ND	ND	ND	ND	ug/kg	7.2
018846-1,2	Soil	Field	12/19/94	ST-2	10	ND	ND	1.3 J	ND	ND	ND	ND	ND	ND	ug/kg	7.5
Drainfield Soil and QA Samples:																
018858-1,2	Soil	Field	12/20/94	DF-1	6.5	ND	ND	1.3 J	ND	ND	ND	ND	ND	ND	ug/kg	7.4
018859-1,2	Soil	Field	12/20/94	DF-1	16.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ug/kg	7.5
018856-1,2	Soil	Field	12/20/94	DF-2	6.5	7.9 J	ND	1.2 J	ND	51 J	ND	36 J	ND	ND	ug/kg	7.5
018857-1,2	Soil	Field	12/20/94	DF-2	16.5	ND	ND	1.2 J	ND	ND	ND	ND	ND	ND	ug/kg	7.6
018854-1,2	Soil	Field	12/20/94	DF-3	6.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ug/kg	7.6
018855-1,2	Soil	Field	12/20/94	DF-3	16.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ug/kg	7.7
018852-1,2	Soil	Field	12/19/94	DF-4	6.5	4.2 B,J	ND	3.3 B,J	ND	ND	ND	ND	ND	ND	ug/kg	7.6
018853-1,2	Soil	Field	12/19/94	DF-4	16.5	3.6 B,J	ND	3.1 B,J	2.1 J	ND	ND	ND	ND	ND	ug/kg	7.5
018849-1,2	Soil	Field	12/19/94	DF-5	6.5	ND	ND	3.9 B,J	ND	ND	ND	ND	ND	ND	ug/kg	7.7
018850-1,2	Soil	Dupl.	12/19/94	DFD-5	6.5	3.9 B,J	ND	3.5 B,J	ND	ND	ND	ND	ND	ND	ug/kg	NS
018851-1,2	Soil	Field	12/19/94	DF-5	16.5	ND	ND	3.2 B,J	ND	ND	ND	ND	ND	ND	ug/kg	7.5
018847-1,2	Soil	Field	12/19/94	DF-6	6.5	ND	ND	3 B,J	ND	ND	200 J	ND	ND	ND	ug/kg	7.6
018848-1,2	Soil	Field	12/19/94	DF-6	16.5	ND	ND	3 B,J	ND	ND	ND	ND	ND	ND	ug/kg	7.6
018860-1,2,5,6	Water	EB	12/20/94	Site 138	NA	ND	ND	1.4 B,J	ND	ND	ND	ND	ND	ND	ug/L	NS
021314-1	Soil	TB	12/20/94	Site 138	NA	22	10 J	4 J	ND	NS	NS	NS	NS	NS	ug/kg	NS
Laboratory Reporting Limit for Soil						10	10	5	5	330	330	330	500	33	ug/kg	
Laboratory Reporting Limit for Water						10	10	5	5	10	10	10	10	1	ug/L	
Proposed Subpart S Action Level For Soil						8E+06	8E+06	9E+04	2E+07	5E+04	6E+06	5E+07	2E+06	9E+01	ug/kg	

Notes:

B = Compound detected in associated method blank sample
BEHP = Bis(2-Ethylhexyl)phthalate
Dupl. = Duplicate soil sample
EB = Equipment blank
fbgs = feet below ground surface

J = Result is detected below the reporting limit or is an estimated concentration.
MEK = Methyl ethyl ketone
NA = Not applicable
ND = Not detected
NS = No sample

PCBs = Polychlorinated biphenyls
QA = Quality assurance
SVOCs = Semivolatile organic compounds
TB = Trip blank
ug/kg = Micrograms per kilogram
ug/L = Micrograms per liter
VOCs = Volatile organic compounds

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Table 3-3

ER Site 138
Summary of RCRA Metals and Nickel in Confirmatory Soil Samples
Collected Around the Septic Tank and in the Drainfield

Sample Number	Sample Matrix	Sample Type	Sample Date	Sample Location (Figure 2)	Top of Sample Interval (fbgs)	RCRA Metals, Methods 6010 and 7471								Other Metals	Units
						As	Ba	Cd	Cr, total	Pb	Hg	Se	Ag	Nickel Method 6010	
Septic Tank Soil Samples:															
018845-2	Soil	Field	12/19/94	ST-1	10	2.7	106	ND	7.9	7.5	ND	ND	ND	37	mg/kg
018846-2	Soil	Field	12/19/94	ST-2	10	2.9	139	ND	9	ND	ND	ND	ND	20.5	mg/kg
Drainfield Soil and QA Samples:															
018858-2	Soil	Field	12/20/94	DF-1	6.5	3	169	ND	7.5	ND	ND	ND	ND	108	mg/kg
018859-2	Soil	Field	12/20/94	DF-1	16.5	2.9	132	ND	9	ND	ND	ND	ND	83.5	mg/kg
018856-2	Soil	Field	12/20/94	DF-2	6.5	2.8	86	ND	9.5	5.8	ND	ND	ND	63.5	mg/kg
018857-2	Soil	Field	12/20/94	DF-2	16.5	2.4	71.7	ND	8	ND	ND	ND	ND	91.6	mg/kg
018854-2	Soil	Field	12/20/94	DF-3	6.5	2.8	143	ND	13	ND	ND	ND	11.9	9.2	mg/kg
018855-2	Soil	Field	12/20/94	DF-3	16.5	1.9	91.1	ND	7.9	ND	ND	ND	ND	73.6	mg/kg
018852-2	Soil	Field	12/19/94	DF-4	6.5	3.3	497	ND	8.7	5.1	ND	ND	ND	7.5	mg/kg
018853-2	Soil	Field	12/19/94	DF-4	16.5	2.6	85.9	ND	7.3	ND	ND	ND	ND	16.5	mg/kg
018849-2	Soil	Field	12/19/94	DF-5	6.5	3.3	191	ND	7.6	5	ND	ND	ND	9.7	mg/kg
018850-2	Soil	Dupl.	12/19/94	DFD-5	6.5	3	200	ND	8.5	5	ND	ND	ND	10.7	mg/kg
018851-2	Soil	Field	12/19/94	DF-5	16.5	2	70.8	ND	8.2	ND	ND	ND	ND	29.1	mg/kg
018847-2	Soil	Field	12/19/94	DF-6	6.5	2.9	109	ND	9.6	5.6	ND	ND	ND	24.9	mg/kg
018848-2	Soil	Field	12/19/94	DF-6	16.5	2.6	138	ND	6.9	ND	ND	ND	ND	24.6	mg/kg
018860-3,4	Water	EB	12/20/94	Site 138	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	mg/L
Laboratory Reporting Limit For Soil						1	1	0.5	1	5	0.1	0.5	1	4	mg/kg
Laboratory Reporting Limit for Water						0.01	0.01	0.005	0.01	0.003	0.0002	0.005	0.01	0.04	mg/L
Number of SNL/NM Background Soil Sample Analyses *						15	727	1,740	647	536	1,724	2,134	2,302	1,016	mg/kg
SNL/NM Soil Background Range *						2.1-7.9	0.5-495	0.0027-6.2	0.5-31.4	0.75-103	0.0001-0.68	0.037-17.2	0.0016-8.7	0.5-70.2	mg/kg
SNL/NM Soil Background UTL or 95th Percentile *						7	214	0.9	15.9	11.8	<0.1	<1.0	<1.0	11.5	mg/kg
Proposed Subpart S Action Level For Soil						0.50	6,000	80	80,000 **	400 ***	20	400	400	2,000	mg/kg

Table 3-3, concluded:

ER Site 138
Summary of RCRA Metals and Nickel in Confirmatory Soil Samples
Collected Around the Septic Tank and in the Drainfield

Notes:
As = Arsenic. Arsenic background concentrations presented above are based on analyses of subsurface soil samples collected in the Coyote Test Field (CTF) area.
Ba = Barium. Barium background concentrations presented above are based on analyses of subsurface soil samples collected in the Southwest and CTF areas.
Cd = Cadmium. Cadmium background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF, and Offsite areas.
Cr = Chromium. Chromium background concentrations presented above are based on analyses of subsurface soil samples collected in the Southwest area.
Ni = Nickel. Nickel background concentrations presented above are based on analyses of surface and subsurface samples collected in the Southwest and CTF areas.
Pb = Lead. Lead background concentrations presented above are based on analyses of subsurface samples collected in the Southwest and Offsite areas.
Hg = Mercury. Mercury background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF and Offsite areas.
Se = Selenium. Selenium background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the North, Tijeras, Southwest, CTF and Offsite areas.
Ag = Silver. Silver background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF, and Offsite areas.

Dupl. = Duplicate soil sample
EB = Equipment blank
fbgs = Feet below ground surface
mg/kg = Milligrams per kilogram
mg/L = Milligrams per liter
NA = Not applicable
ND = Not detected
QA = Quality assurance
RCRA = Resource Conservation and Recovery Act
UTL = Upper Tolerance Limit
* IT March 1996
** 80,000 mg/kg is for Cr^{3+} only. For Cr^{6+}, proposed Subpart S action level is 400 mg/kg.
*** No proposed Subpart S action level for lead in soil; 400 ppm is EPA proposed action level (EPA July 1994)

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Table 3-4

ER Site 138
Summary of Isotopic Uranium and Tritium in Confirmatory Soil Samples Collected Around the Septic Tank and in the Drainfield

Sample Number	Sample Matrix	Sample Type	Sample Date	Sample Location (Figure 2)	Top of Sample Interval (fbgs)	Isotopic Uranium Method HASL-300 (pCi/g for soil, pCi/L for water) U-233/ U-234 Result	U-233/ U-234 Error *	U-233/ U-234 M.D.A.	U-235 Result	U-235 Error *	U-235 M.D.A.	U-238 Result	U-238 Error *	U-238 M.D.A.	Tritium Method EPA-600 906.0 (pCi/L) Result	Error *	M.D.A.
Septic Tank Soil Samples:																	
018845-5	Soil	Compos.	12/19/94	ST-1/2	10	0.73	0.17	0.074	0.054 J	0.046	0.061	0.79	0.17	0.061			
018860-7	Water	EB	12/20/94	Site 138	NA	0.057 J	0.082	0.13	0.021 J	0.082	0.17	0.021 J	0.082	0.17			
018845-4	Soil	Compos.	12/19/94	ST-1/2	10										ND	1,500	2,500
Drainfield Composite Soil Samples:																	
018847-5	Soil	Compos.	12/19/94	DF-1/6	6.5	0.82	0.16	0.057	0.036	0.03	0.036	0.69	0.14	0.036			
018848-5	Soil	Compos.	12/19/94	DF-1/6	16.5	0.59	0.13	0.059	0.041	0.032	0.036	0.7	0.14	0.049			
018847-4	Soil	Compos.	12/19/94	DF-1/6	6.5										ND	140	250
018848-4	Soil	Compos.	12/19/94	DF-1/6	16.5										ND	1,500	2,500
Number of SNL/NM Background Soil Sample Analyses **						14			283			90			U		
SNL/NM Soil Background Range **						0.44-<5.02			0.004-3			0.153-2.3			U		
SNL/NM Soil Background 95th Percentile **						<5.02			0.16			1.4			U		
Nationwide Tritium Range in Precipation and Drinking Water ***						NA			NA			NA			100-400		

Notes:

U-233 = Uranium 233

U-234 = Uranium 234. Uranium 233/234 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

U-235 = Uranium 235. Uranium 235 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

U-238 = Uranium 238. Uranium 235 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

Compos. = Composite
EB = Equipment blank
fbgs = Feet below ground surface
J = Result is detected below the reporting limit or is an estimated concentration.

M.D.A. = Minimum detectable activity
NA = Not applicable
ND = Not detected
pCi/g = Picocuries per gram
pCi/L = Picocuries per liter

U = Undefined for SNL/NM soils
* Error = +- 2 sigma uncertainty
** IT March 1996
*** EPA October 1993

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As shown on Table 3-3, septic tank and drainfield soil sample analytical results indicate that the nine metals that were targeted in the Site 138 investigation were either (1) not detected, or (2) were detected in concentrations below the background UTL or 95th percentile concentrations presented in the SNL/NM study of naturally-occurring constituents (IT March 1996), or (3) were less than the proposed Subpart S or other action levels for these metals.

As shown on Table 3-4, the results of the isotopic uranium analysis were all below the 95th percentile background concentrations. Tritium was not detected in soil moisture from the shallow and deep interval composite samples collected from the drainfield sampling intervals, or from the composite sample collected from either side of the septic tank (Table 3-4). Also, the gamma spectroscopy semi-qualitative screening of composite samples from the drainfield shallow and deep sampling intervals and from the septic tank borehole locations did not indicate significant concentrations of other radionuclides in soils at this site (Appendices A.3, A.4, and A.5).

Finally, the ER Site 138 septic tank contents were removed and the tank was cleaned in October 1995 (SNL/NM October 1995). The tank was then inspected by a representative of the New Mexico Environment Department (NMED) to verify that the tank contents had been removed and the tank closed in accordance with applicable State of New Mexico regulations (SNL/NM December 1995).

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4. CONCLUSION

Sample analytical results generated from this confirmatory sampling investigation have shown that detectable or significant concentrations of COCs are not present in soils at ER Site 138, and that additional investigations are unwarranted and unnecessary. Based on archival information and chemical and radiological analytical results of soil samples collected next to the septic tank, and in the drainfield, SNL/NM has demonstrated that any contaminants present at this site pose an acceptable level of risk under current and projected future land use (Criterion 5 of Section 1.2). Therefore, ER Site 138 is recommended for an NFA determination.

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5. REFERENCES

5.1 ER Site 138 References

Sandia National Laboratories/New Mexico (SNL/NM), June 1959, "SNL/NM Facilities Engineering Drawing Number 81665", June 18, 1959, KAFB, Albuquerque, NM.

Sandia National Laboratories/New Mexico (SNL/NM), May 1994, Field Log #0080, Page 12, 5/9/94, Field notes for ER Site 138 first round septic tank sampling.

Sandia National Laboratories/New Mexico (SNL/NM), September 1994, Field Log #0096, Page 24, 9/6/94, Field notes for ER Site 138 drainfield excavation.

Sandia National Laboratories/New Mexico (SNL/NM), November 1994b, Field Log #0102, Page 2, 11/16/94, and Field Log #0080, Page 40, 6/21/94, Field notes for ER Site 138 passive soil gas survey.

Sandia National Laboratories/New Mexico (SNL/NM), December 1994a, Field Log #0096, Pages 148-152, 12/19/94 and 12/20/94, Field notes for ER Site 138 septic tank and drainfield soil sampling.

Sandia National Laboratories/New Mexico (SNL/NM), December 1994b, Environmental Operations Records Center, Record Number ER/1295-138/DAT, Chain of Custodies 2373, 2374, and 2383, Analytical reports for ER Site 138 septic tank and drainfield soil sampling.

Sandia National Laboratories/New Mexico (SNL/NM), January 1995, Field Log #0100, Pages 33-34, 1/23/95, Field notes for ER Site 138 second round septic tank sampling.

Sandia National Laboratories/New Mexico (SNL/NM), October 1995, Field Log #0139, Pages 97-100, 10/10/95, Field notes for the ER Site 138 septic tank septage removal and cleaning operation.

Sandia National Laboratories/New Mexico (SNL/NM), December 1995, Field Log #0139, Page 184, 11/7/95, Field notes for the NMED empty tank verification inspection for the ER Site 138 septic tank.

5.2 Other References

Department of Energy (DOE), Albuquerque Operations Office, Environmental Safety and Health Division, Environmental Program Branch, September 1987, draft "Comprehensive Environmental Assessment and Response Program (CEARP) Phase 1: Installation Assessment, Sandia National Laboratories, Albuquerque", Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.

IT Corporation (IT), March 1994, "Sampling and Analysis Plan for Shallow Subsurface Soil Sampling, RCRA Facility Investigation of Septic Tanks and Drainfields (OU 1295)", IT Corporation, Albuquerque, New Mexico.

IT Corporation (IT), January 1996, draft "Background Concentrations of Constituents of Concern to the Sandia National Laboratories/New Mexico Environmental Restoration Program and the Kirtland Air Force Base Installation Restoration Program", IT Corporation, Albuquerque, New Mexico.

Lamb Associates, Inc. (Lamb), 1994, "Geophysical Surveys at 23 Sites, Septic Tanks and Drainfields, ADS #1295", Lamb Associates, Inc., Albuquerque, NM.

New Mexico Environment Department (NMED), November 1995, "Environmental Restoration Document of Understanding", Santa Fe, New Mexico.

Northeast Research Institute (NERI), June 1995, "PETREX™ Soil Gas Survey Results Conducted at Various Sites of the Septic Tanks and Drainfields Operating Units, Sandia National Laboratories", Albuquerque, New Mexico, Northeast Research Institute, Lakewood, Colorado.

Sandia National Laboratories/New Mexico (SNL/NM), March 1993, "Septic Tanks and Drainfields (ADS-1295) RCRA Facility Investigation Work Plan", Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), November 1994a, "Comment Responses to USEPA Notice of Deficiency November 1994", Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), February 1995, "Program Implementation Plan for Albuquerque Potential Release Sites", Sandia National Laboratories Environmental Restoration Program, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), October 1995, SNL ER Sites, "Well Locations at Kirtland Air Force Base", SNL Geographic Information System Map # 951461, October 10, 1995.

Sandia National Laboratories/New Mexico (SNL/NM), March 1996, "Site-Wide Hydrogeologic Characterization Project, Calendar Year 1995 Annual Report", Sandia National Laboratories Environmental Restoration Project, Albuquerque, New Mexico.

U.S. Environmental Protection Agency (EPA), April 1987, "Final RCRA Facility Assessment Report of Solid Waste Management Units at Sandia National Laboratories, Albuquerque, New Mexico," Contract No. 68-01-7038, EPA Region VI.

U.S. Environmental Protection Agency (EPA), December 1987, "Hazardous Waste; Codification Rule for 1984 RCRA Amendments; Final Rule", *Federal Register*, Vol. 52, Title 40, Parts 144, 264, 265, 270, and 27, Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), July 1990, "Corrective Action for Solid Waste Management Units (SWMU) at Hazardous Waste Management Facilities, Proposed Rule," *Federal Register*, Vol. 55, Title 40, Parts 264, 265, 270, and 271.

U.S. Environmental Protection Agency (EPA), August 1992, "Hazardous Waste Management Facility Permit No. NM5890110518," EPA Region VI, issued to Sandia National Laboratories, Albuquerque, New Mexico.

U.S. Environmental Protection Agency (EPA), August 1993, "Module IV of RCRA Permit No. NM 5890110518," EPA Region VI, issued to Sandia National Laboratories, Albuquerque, New Mexico.

U.S. Environmental Protection Agency (EPA), October 1993, "Environmental Radiation Data Report 73, January-March 1993", Report Number EPA 402-R-93-092, National Air and Radiation Environmental Laboratory, Montgomery, Alabama.

U.S. Environmental Protection Agency (EPA), July 1994, "Guidance on Residential Lead-Based Paint, Lead-Contaminated Dust, and Lead-Contaminated Soil," Memorandum from Lynn R. Goldman, M.D., USEPA Assistant Administrator to EPA Regional Directors.

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October 13, 2003

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